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0^s value rounded to 0 (zero) where there is a meaningful distinction between true zero and the value that was rounded
^{p} preliminary
^{r} revised
x suppressed to meet the confidentiality requirements of the *Statistics Act*
^{E} use with caution
F too unreliable to be published
* significantly different from reference category ($p < 0.05$)

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Regional differences in the educational outcomes of young immigrants

by Feng Hou and Qi Zhang

Overview of the study

This article examines regional differences in the math and reading skills of immigrant children aged 15 based on data from the Programme for International Student Assessment (PISA). It also examines regional differences in high-school and university completion rates among young immigrants who came to Canada before the age of 15 using National Household Survey (NHS) data. Throughout the article, comparisons are made with the children of the Canadian-born (third- or higher-generation Canadians).

- In Canada, the average PISA math score of immigrant students aged 15 was similar to the score of third- or higher-generation students. The average PISA reading score of immigrant children was slightly lower than the score of third- or higher-generation children.
- In almost all regions, immigrant students had lower PISA reading scores than third- or higher-generation students. With respect to PISA math scores, immigrant students performed better than third- or higher-generation students in the Atlantic provinces and British Colombia, but performed less well in Quebec and in Manitoba and Saskatchewan.
- Young immigrants aged 20 to 24 were more likely to have a high school diploma than their third- or higher-generation counterparts (93% versus 87%). Young immigrants aged 25 to 29 were also more likely to have a university degree (40%, compared with 26% of third- or higher-generation individuals in this age group).
- Manitoba and Saskatchewan (29%) and Quebec (32%) had the lowest proportions of immigrants aged 25 to 29 with a university degree. In contrast, British Columbia (44%) and Ontario (41%) had the highest proportions.
- Regional differences in the source countries of immigrants explained, in part, why some regions had higher university completion rates than others.

Introduction

Canada is well-known for its success in integrating the children of immigrants into the education system and labour market. In particular, the children of immigrants generally outperform the children of Canadian-born parents in educational attainment by a large margin. Previous studies have attributed this success to the socioeconomic and cultural characteristics of Canada's immigrants and the efficacy of Canada's education and social policies.[1]

While education systems and social policies are broadly similar across regions, the socioeconomic status and ethnocultural composition of immigrants vary considerably. Such regional differences in immigrant characteristics may be associated with regional differences in the educational outcomes of immigrant children. Previous studies have shown large variations in educational outcomes among children of immigrants from different source regions.[2] Immigrant groups from various source regions may be attracted to particular Canadian regions because of their preferences for certain regional attributes such as climate, language, pre-existing ethnic communities and labour market niches. The diverse roles of provincial governments in immigration selection and settlement may also lead to differences in the geographic distribution of immigrant groups.

In Quebec, for instance, proportionately more immigrants selected by the province come from Africa, the Middle East, the Caribbean, and South and Central America.[3] Since the late 1990s, other provinces and territories have also become actively involved in immigration selection through nominee programs. These programs allow provinces and territories to nominate and select immigrants to meet their needs for population growth and labour supply. So far, provincial nominees have made up a significant share of immigrants to Manitoba, Saskatchewan and the Atlantic provinces.[4] From one province to another, nominees vary considerably in socioeconomic characteristics and source regions. Previous studies have shown that provincial nominees in Manitoba have lower education levels than federal skilled-worker immigrants and are far more likely to come from the Philippines, while provincial nominees in British Columbia are disproportionately high-skilled professionals from Western countries.[5]

This article has two main objectives. First, it examines the regional differences in reading and math scores between immigrants who immigrated to Canada in their childhood (before the age of 15) and the children of two parents who were born in Canada—also called third-or higher-generation children. It does so by combining data from the various cycles of the Organisation for Economic Co-operation and Development's (OECD) Programme for International Student Assessment (PISA) conducted since 2000 (i.e., 2000 and 2009 for reading scores and 2003 and 2012 for math scores). Data for these years were aggregated to obtain sufficiently large samples of immigrants for each region. Second-generation children, defined as the children of one or two immigrant parents, are not included in this study (see *Data sources, methods and definitions*).

Secondly, this paper examines regional differences in various educational attainment measures among individuals who immigrated in their childhood (before the age of 15) on the basis of data from the 2011 National Household Survey (NHS). Two particular measures are examined: high-school completion among young adults aged 20 to 24, and university completion among those aged 25 to 29. In both cases, this article further examines whether differences in the educational outcomes of immigrants across regions of Canada are associated with differences in their socioeconomic and ethnocultural characteristics.

PISA scores in reading and math vary across regions

The academic skills youth develop in high school are considered their foundation for further development of human capital and full participation in society.[6] In a global context, Canadian students perform relatively well in reading and mathematics. Several recent evaluations from PISA have placed Canada among the top participating countries in student performance levels and equity in learning opportunities. Canada, like Australia, stood out among major OECD countries in the population share of immigrant students and math and reading performance in high school. In most OECD countries, immigrant students lagged behind third- or higher-generation students in academic skills, but, in Canada and Australia, this gap was relatively small.[7]

At the national level, immigrant students in Canada had similar math scores and slightly lower reading scores than third- or higher-generation students. The lower reading levels likely reflect the fact that the mother tongue of many immigrant students is neither English nor French.[8]

The differences in scores obtained between immigrant and third- or higher-generation students, however, were not the same from one region to another in Canada. Immigrant students in British Columbia and the Atlantic provinces, for example, had significantly higher math scores than third- or higher-generation students (Table 1), while immigrant students had lower math and reading scores than third- or higher-generation students in Quebec, and in Manitoba and Saskatchewan (the latter two provinces have been combined because of small sample sizes).

Furthermore, interregional differences in math and reading scores were larger among immigrant students than among third- or higher-generation students. Among third- or higher-generation students, math scores ranged from 545 (in Quebec) to 505 (in the Atlantic provinces), a difference of 40 points. Among immigrant students, they ranged from 554 (in British Columbia) to 494 (in Manitoba and Saskatchewan), a difference of 60 points.

Regional differences in math and reading scores among high-school students may originate partially from variations across provinces in school curriculums; the share of public, religious and private schools; teacher training; and school resources.[9] Among immigrants, however, interregional differences in characteristics and family background may also play an

Table 1
Average math and reading scores by immigration status and province or region

	Immigrant children		Third- and higher-generation children (ref.)	
	mean	standard error	mean	standard error
Math scores, 2003 and 2012 combined				
Canada	530	3.5	529	1.3
Atlantic	531***	7.3	505	1.5
Quebec	508***	6.3	545	2.7
Ontario	532	5.9	526	3.2
Manitoba and Saskatchewan	494***	4.8	514	1.5
Alberta	527	7.0	536	2.9
British Columbia	554***	4.4	526	2.9
Reading scores, 2000 and 2009 combined				
Canada	517***	3.2	532	1.1
Atlantic	508	10.5	508	1.2
Quebec	485***	8.2	536	2.0
Ontario	523*	4.4	536	2.5
Manitoba and Saskatchewan	477**	14.0	522	2.2
Alberta	527	12.2	540	3.1
British Columbia	523*	4.4	534	2.8

* significantly different from the reference category (ref.) at p<0.05, ** p<0.01, *** p<0.001

Sources: Organisation for Economic Co-operation and Development, Programme for International Student Assessment (PISA), 2000, 2003, 2009 and 2012.

Table 2
Parental education and student aspiration by immigration status and province or region, 2003 and 2012

	Immigrant children		Third- and higher-generation children (ref.)	
	percent	standard error	percent	standard error
Both parents had a postsecondary education				
Canada	58.3***	2.4	35.6	1.6
Atlantic	62.2***	1.0	30.3	0.8
Quebec	50.4***	2.3	34.2	2.2
Ontario	60.2***	3.4	43.6	2.8
Manitoba and Saskatchewan	48.7***	1.3	27.6	1.0
Alberta	55.0***	2.1	36.6	1.9
British Columbia	62.2***	2.1	30.2	1.9
Students expected to finish university				
Canada	81.4***	1.9	59.6	1.6
Atlantic	81.8***	0.8	64.2	0.8
Quebec	73.4***	2.1	55.4	2.3
Ontario	82.9***	2.6	59.5	2.8
Manitoba and Saskatchewan	71.0***	1.2	63.6	1.1
Alberta	81.8***	1.7	63.0	1.9
British Columbia	84.8***	1.5	58.8	2.1

*** significantly different from the reference category (ref.) at p<0.001

Sources: Organisation for Economic Co-operation and Development, Programme for International Student Assessment (PISA), 2003 and 2012.

important role. The extent to which these factors account for regional differences in average test scores between immigrant and third- or higher-generation students will be examined in the next section.

Explaining differences in test scores between immigrants and third- or higher-generation students

Of all the factors that may be associated with the skill development of high-school students, parental education and student aspirations are especially important.[10] In all regions of Canada, parents of immigrant students were more highly educated than parents of third- or higher-generation students. Even so, immigrant parents in Manitoba and Saskatchewan and in Quebec were less likely to have a postsecondary degree than immigrant parents in other regions (Table 2).

Furthermore, in all regions, a higher proportion of immigrant students aspired to finish university than third- or-higher generation students, but again, these proportions varied by region. In British Columbia, Ontario, Alberta and the Atlantic provinces, more than 80% of immigrant students expected to complete a university degree while this was the case for 73% and 71% of immigrant students in Quebec, and in Manitoba and Saskatchewan, respectively.

To evaluate factors contributing to differences in PISA scores between immigrant and third- or higher-generation students, a linear regression model was run. Math and reading scores were included as the dependent variables, while explanatory variables in the model included parental education, student

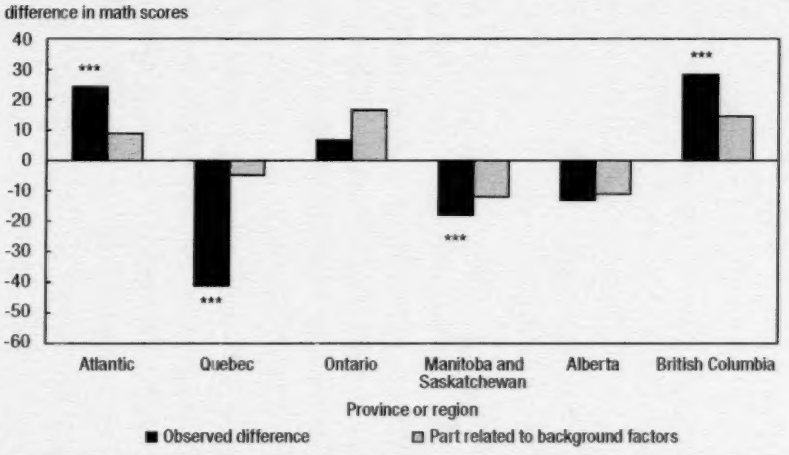
educational aspiration, sex, language spoken at home,[11] family structure, parental occupational status, number of books at home, school type, and year. These factors accounted, in varying degrees, for the differences in PISA scores observed between immigrant and third- or higher-generation students in different regions.[12]

These factors accounted for all of the difference in math scores between immigrant and third- or higher-generation students in Ontario, and for approximately one-half of the difference observed in British Columbia. Differences in the educational aspirations of students, and to a lesser extent, in the educational attainment and occupations of parents, were the main factors accounting for the advantage of immigrant students in British Columbia and Ontario (Chart 1).

Among provinces or regions where immigrant students lagged behind third- or higher-generation students in math scores, speaking neither English nor French at home was a common factor contributing to the lower outcomes of immigrant students. This was the case in Alberta and in Manitoba and Saskatchewan, where most of the gap could be accounted for by background variables. In Quebec, however, only about one-tenth of the 40-point gap between immigrant and third- or higher-generation students was accounted for by background factors.

With regard to PISA reading scores, socioeconomic characteristics accounted for about one-third of the 50-point gap between immigrant and third- or higher-generation students in Quebec, for one-half of the 13-point gap in Ontario, for two-thirds of the 45-point gap in Manitoba and Saskatchewan, and for the entire gap in Alberta (13 points) and British Columbia (11 points). In all regions, the primary factor associated with the explained portion was language spoken at home (Chart 2).

Chart 1
Difference between immigrant children and third- and higher-generation children in math scores, 2003 and 2012



*** significant difference between immigrant children and third- and higher-generation students at p<0.001
Sources: Organisation for Economic Co-operation and Development, Programme for International Student Assessment (PISA), 2003 and 2012.

Why do immigrants have better PISA scores in some regions than others?

The previous section documented some of the factors contributing to the differences in PISA scores observed between immigrant students and third- or higher-generation students within regions. The focus of this paper now shifts to the differences in PISA scores observed among immigrant students across regions. As shown above, immigrant students in Quebec and in Manitoba and Saskatchewan had lower math and reading scores than immigrant students in other provinces. Such differences may again be related to socioeconomic and ethnocultural characteristics of immigrant students in different provinces.[13]

These characteristics accounted for about one-third of the lower math scores obtained by immigrant students in Quebec and in Manitoba and Saskatchewan relative to their Ontario counterparts (Table 3), with lower educational aspirations and parental occupational status the most significant factors. Conversely, about one-third of the higher math scores obtained by immigrant students in British Columbia (relative to their Ontario counterparts) were due to background factors, particularly educational aspirations, parental occupation, and parental education.

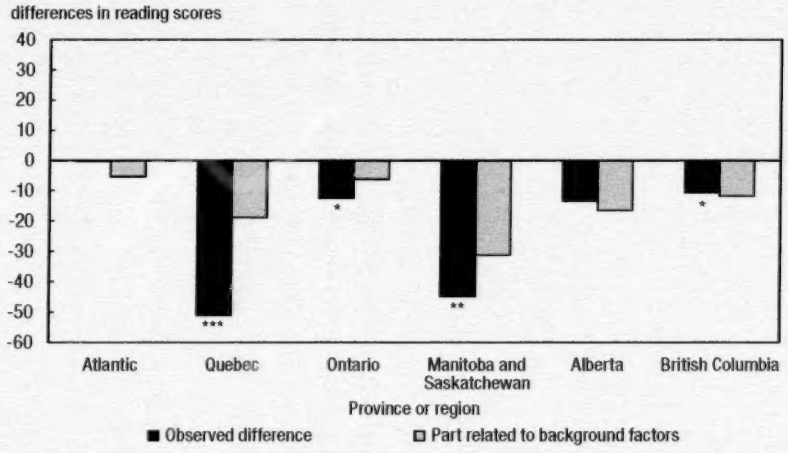
Differences in reading scores were also partly explained by background characteristics. About one-third of the overall difference between Ontario and Quebec immigrants, for instance, were related to

characteristics such as the number of books at home, language spoken at home, educational aspiration, and parental occupation. Background differences also accounted for about one-third of the difference between Ontario and Manitoba/Saskatchewan, with parental occupation and educational aspiration variables the main contributing factors.

Note that the PISA data used in this study does not provide information about the source region of immigrant students. Previous studies show that the educational attainment of immigrant children varies considerably by source region even after adjusting for family socioeconomic status and students' educational aspiration. The variation by source region likely reflects the possibility that various immigrant groups value education differently and invest varied levels of effort into the education of their children.[14] Children of immigrants from East Asia (e.g., China) and South Asia (e.g., India), in particular, tend to have a higher educational attainment than those from Southeast Asia (e.g., Philippines), the Caribbean, Central and South America, and Southern Europe.[15]

The potential effects of source regions on the regional differences in educational outcomes among childhood immigrants can be examined using the 2011 National Household Survey (NHS), which collected detailed information about the source countries and educational attainment of immigrants.

Chart 2
Difference between immigrant children and third- and higher- generation children in reading scores, 2000 and 2009



* significant difference between immigrant children and third- and higher-generation students at p<0.05, ** p<0.01, *** p<0.001
Sources: Organisation for Economic Co-operation and Development, Programme for International Student Assessment (PISA), 2000 and 2009.

Table 3
Difference by province or region from Ontario in average math and reading scores among immigrant children, observed and adjusted for background factors

	Math, 2003 and 2012 combined		Reading, 2000 and 2009 combined	
	observed difference	adjusted difference	observed difference	adjusted difference
Province or region				
Atlantic	-0.8	-9.2	-14.7	-24.6*
Quebec	-23.9**	-15.1	-37.4***	-23.7**
Ontario (ref.)	...	...	...	...
Manitoba and Saskatchewan	-38.0***	-22.2**	-45.6**	-29.6***
Alberta	-5.4	-4.9	3.8	7.4
British Columbia	22.0**	15.9**	0.1	-7.0

... not applicable
* significantly different from the reference category (ref.) at p<0.05, ** p<0.01, *** p<0.001
Note: The adjusted difference is derived from an ordinary least squares regression model with math or reading scores as the dependent variable. The explanatory variables include sex, language spoken at home, family structure, parents' education, parents' occupation, number of books at home, school type, and student educational aspiration.
Sources: Organisation for Economic Co-operation and Development, Programme for International Student Assessment (PISA), 2000, 2003, 2009 and 2012.

Regional differences in high-school and university completion rates

The NHS does not collect information on math and reading scores. It does, however, collect information about the highest level of educational attainment, allowing for the calculation of high school and university completion rates. In this section, comparisons are again made between third- or higher-generation Canadians and persons who immigrated before the age of 15. High school completion is defined as high school graduation among those aged 20 to 24, while university completion is defined as obtaining at least one university degree among those aged 25 to 29.

In all provinces and regions, and in Canada as a whole, immigrants had higher high-school and university completion rates than third- or higher-generation Canadians. This was also the case in Quebec and in Manitoba and Saskatchewan, even though immigrant students in high school had lower math and reading scores than third- or higher-generation students in those provinces.

Note that some of the 20- to 24-year-olds in the 2011 NHS were in the same birth cohort as those in the 2003 PISA when math scores were evaluated for those at age 15. Similarly, some of the 25- to 29-year-olds in 2011 were in the same birth cohort as those evaluated at age 15 in the 2000 PISA. This suggests that these cohorts of immigrants might have overcome a possible disadvantage in reading skills in high school to eventually become more likely to complete high school and obtain a university degree than their third- and higher-generation counterparts.

Even though immigrants had higher completion rates than their Canadian-born counterparts in all regions, there were significant regional variations in this regard. Young immigrants in British Columbia had the highest high school and university completion rates, while immigrant youth in Quebec and in Manitoba and Saskatchewan had the lowest rates. Specifically, 44% of young immigrants aged 25 to 29 in British Columbia held a university degree, compared with 29% in Manitoba and Saskatchewan and 32% in Quebec (Table 4). The lower rates of university completion observed among immigrants in Quebec, as well as Manitoba and Saskatchewan, mirrored the regional differences in PISA math and reading scores documented above.

Table 4
High school and university completion rates by immigration status and by province or region, 2011

	Third- and higher-generation individuals	Immigrants	
		Observed rate	Adjusted rate
	percentage		
High school completion among those aged 20 to 24			
Canada	86.6	93.1	...
Atlantic	88.5	94.9	95.8
Quebec	84.2	88.6	89.6
Ontario	89.5	93.9	93.9
Manitoba and Saskatchewan	81.7	89.0	90.8
Alberta	83.7	89.6	90.0
British Columbia	88.6	96.2	94.9
University completion among those aged 25 to 29			
Canada	25.7	39.9	...
Atlantic	26.1	37.8	36.1
Quebec	24.8	32.0	35.1
Ontario	28.1	40.9	41.8
Manitoba and Saskatchewan	22.0	29.3	35.3
Alberta	21.4	34.9	35.4
British Columbia	20.9	43.5	37.2

... not applicable

Note: Individuals who changed province of residence in the 5 years prior to the survey were excluded from the calculation of high-school and university completion. The adjusted rate is derived from a probit regression model with high-school or university completion as the dependent variable. The explanatory variables include sex, age, the use of an official language at home, and immigrant source regions.

Source: Statistics Canada, National Household Survey, 2011.

As was the case with math and reading scores, some of these regional differences may be attributable to background characteristics. One such factor includes the source region of immigrants, which can be retrieved from NHS data (contrary to PISA, which did not collect that information in every cycle). The NHS, on the other hand, did not collect information on student aspirations or parental education.

East Asia and South Asia were the two leading immigrant source regions for Canada as a whole in 2011, together accounting for 31% of immigrants aged 20 to 29 (Table 5). These source regions were followed by Southeast Asia and West Asia/Middle East, accounting for another 22%. Together the four Asian regions accounted for more than one-half (53%) of all immigrants aged 20 to 29.

While Ontario was similar to the national average in its composition of immigrant source regions, it had a higher share of young immigrants from South Asia and a lower share of immigrants from East Asia. In British Columbia, East Asians accounted for 41% of immigrants aged 20 to 29, more than twice the national average. In Quebec, the four leading source regions were Africa, West Asia/Middle East, Central and South America and the Caribbean, together accounting for 53% of immigrants aged 20 to 29. In Manitoba and

Table 5
Source region composition of first-generation youth aged 20 to 29 by province or region, 2011

	Canada	Atlantic	Quebec	Ontario	Manitoba and Saskatchewan	Alberta	British Columbia
	percentage						
Source region	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
North America	3.7	23.2	3.5	3.0	5.7	5.4	4.0
Caribbean	5.3	2.5	11.3	6.0	1.8	1.6	0.5
Central and South America	8.6	4.4	12.4	8.2	19.3	10.2	4.8
Northern Europe	3.3	8.0	0.8	3.0	7.2	5.5	4.2
Western Europe	3.0	12.0	6.9	1.8	6.3	5.0	2.3
Southern Europe	5.4	3.6	4.6	6.4	5.4	4.8	2.9
Eastern Europe	10.0	7.4	10.4	11.3	9.9	9.3	6.0
Africa	7.4	8.0	13.9	6.9	7.3	8.2	3.5
South Asia	12.7	4.9	6.3	16.6	5.2	9.2	8.2
Southeast Asia	10.4	3.6	6.8	9.0	21.6	15.0	14.0
East Asia	18.5	6.5	7.4	15.4	5.6	15.2	41.0
West Asia	11.2	15.3	15.6	12.0	4.2	9.3	6.9
Oceania and other	0.6	0.6	0.1	0.3	0.8	1.4	1.7

Source: Statistics Canada, National Household Survey, 2011.

Saskatchewan, Southeast Asians accounted for 22% of immigrants of this age group, more than double the national average; immigrants from Central and South America accounted for another 19% (more than twice the national average).

Such differences in source regions were significantly associated with regional differences in high school and university completion rates. As shown in the third column of Table 4, once regional differences in immigrant source region, as well as age, sex, and use of official language at home were taken into account, regional differences in educational attainment became smaller—especially in the case of university completion.

Accounting for differences in source-region composition, age, sex, and use of official language reduced the overall difference in university completion rates between the province with the highest rate and the province with the lowest rate, from 15 percentage points (between 44% in British Columbia and 29% in Manitoba and Saskatchewan) to 7 percentage points. Differences in immigrant source regions played the largest role in this reduction.

Since the NHS does not contain direct measures of parents' socioeconomic status and student aspirations, however, it is not clear to what extent the effect of source-region composition reflects differences in family socioeconomic status and individual motivations.

Conclusion

In Canada, immigrant students (who arrived before the age of 15) tend to have similar math skills and lower reading skills than third- or higher-generation students in high school. Immigrants, however, have higher rates of high-school and university completion than their third- and higher-generation counterparts.

The educational outcomes of immigrants were characterized by significant regional differences. For instance, immigrant students in Quebec and in Manitoba and Saskatchewan lagged behind their counterparts in other provinces in their PISA math and reading scores in high school, high-school completion rates at ages 20 to 24, and university completion rates from ages 25 to 29. Some of these differences were related to differences in the background characteristics of immigrants—note, however, that differences in source countries cannot be accounted for with PISA data. Differences in source countries matter—they helped explain a significant part of the regional differences in the university completion rates of young immigrants (according to NHS data).

Regional differences in immigrant source countries may be the result of multiple factors that include preferences for different regional attributes, immigrant selection programs that direct immigrants to specific regions of the country, and interprovincial migration flows among immigrants.[16] According to previous research, immigration selection and settlement polices are more likely to affect the destination of immigrants than subsequent interprovincial mobility.[17] Differences in source country, along with the effect of background characteristics such as parental aspirations and parental education, will likely continue to influence regional variations in the educational outcomes of young immigrants in the future.

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Data sources, methods and definitions

Data sources

Through its triennial survey of 15-year-old students around the world, the Organisation for Economic Co-operation and Development's (OECD) Programme for International Student Assessment (PISA) assesses the extent to which students near the end of compulsory education have acquired key knowledge and skills that are essential for full participation in modern society. The assessment covers reading, mathematics, science and problem-solving, and focuses on one of these three domains in any given survey.

The 2003 and 2012 PISA surveys focused on mathematics, with reading, science and problem-solving as minor areas of assessment. PISA measures mathematics skills in terms of "the capacity of individuals to formulate, employ and interpret mathematics in a variety of contexts." This includes the capacity "of individuals to reason mathematically and use mathematical concepts, procedures, facts and tools to describe, explain and predict phenomena".[1] Students are evaluated across four overarching dimensions that relate to numbers, algebra and geometry: quantity, space and shape, change and relationships, and uncertainty and data. The PISA math scores are standardized with an average of 500 points and a standard deviation of 100 for the total sample from all participating OECD countries in 2003. In the 2012 PISA, the average was 494 for all OECD countries and 521 for Canada. In the pooled 2003 and 2012 PISA data, there were 3,100 immigrant students who arrived during their childhood (before the age of 15) and 35,260 third- or higher-generation students. At the regional level, the sample size for immigrants who arrived before the age of 15 ranged from 250 in the Atlantic provinces to 860 in Ontario.

Reading literacy was the focus of the 2000 and 2009 PISA surveys. PISA defines reading literacy as the ability to understand, use and reflect upon written texts. Specifically, reading ability is measured in three major domains: (1) the ability to read various types of text, including different types of prose, forms, charts and diagrams; (2) the ability to retrieve, understand, interpret and reflect upon text; and (3) the ability to be able to relate the text to its intended use (for example, documents for private use, public use, work-related use or educational purposes). In the pooled 2000 and 2009 PISA data, there were 3,210 childhood immigrant students and 39,030 third- or higher-generation students. At the regional level, the sample size for immigrants who immigrated before the age of 15 ranged from 170 in the Atlantic provinces to 940 in Ontario.

The 2011 National Household Survey is used to compare the high school and university completion rates of young immigrants who immigrated during their childhood (before the age of 15) with third- or higher-generation Canadians.[2] The sample size was 39,300 for immigrants aged 20 to 24, 32,700 for immigrants aged 25 to 29, 276,500 for third- or higher-generation individuals aged 20 to 24, and 263,100 for third- or higher-generation individuals aged 25 to 29. Immigrant source regions are classified into 14 groups: North America, Caribbean, Central and South America, Northern Europe, Western Europe, Southern Europe, Eastern Europe, Africa, South Asia, Southeast Asia, East Asia, West Asia, Oceania and others.

Additional analyses were also conducted for Canadian-born students with two immigrant parents (the second generation) or with one immigrant parent and one Canadian-born parent (also called the "2.5 generation"), but differences in education outcomes between second-generation or 2.5-generation immigrants and third- or higher-generation students varied little across regions. Readers should keep in mind, however, that immigrant parents of second- or 2.5-generation students mostly arrived before the 1990s and did not come from the same source countries as the parents of immigrants who arrived before the age of 15.

1. See OECD (2014), p. 25.
2. See Statistics Canada (2013).

Notes

1. See Picot and Hou (2013); Reitz et al. (2011).
2. See Abada et al. (2009); Finnie (2012).
3. See Blad and Couton (2009); Nadeau and Seckin (2010).
4. See Pandey and Townsend (2013).
5. See Pandey and Townsend (2013); Zhang (2012).
6. See Brochu et al. (2013).
7. See OECD (2013).
8. See Worswick (2004).
9. See Carlson (2014).
10. See Foley et al. (2014); Picot and Hou (2013).
11. The model included five levels of parental education: both parents with tertiary education; only one parent with tertiary education; both parents with upper secondary (high school) education; only one parent with upper secondary education; both parents with a lower than upper secondary education. Student educational aspiration is coded as 1 if the student expects to finish university, 0 otherwise. Family structure has three categories: two-parent families; single-parent families; and other family types. Language at home is coded as 1 if the student speaks the same language at home as the PISA reading or math test (French in Quebec and English in other regions), 0 otherwise. Parental

occupation is determined by the International Socio-Economic Index of Occupational Status (ISEI). In PISA, the ISEI is based on the highest occupational status of the mother or father.

12. By definition, factors specific to immigrants (e.g., age at immigration) should not be included in the model comparing immigrant and third- or higher-generation students.

13. Age at immigration was not collected in the 2000 PISA, but it was included in subsequent versions of the survey. In an alternative model based on the pooled 2003 and 2012 data, age at immigration was included but contributed little to regional differences in math scores because this variable differs little across regions. In order to keep the models consistent between reading (based on the pooled 2000 and 2009 data) and math, age at immigration was not included in the final model.

14. See Picot and Hou (2013); Finnie (2012).

15. See Abada et al. (2009); Picot and Hou (2013).

16. See Bonikowska et al. (2015).

17. See Hou (2007); Pandey and Townsend (2013).

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